

CLAIMS

Having thus described the invention, what is claimed is:

1. A bending system in a bending machine for bending rod shaped and bar-shaped workpieces incorporates at least one multilevel bending tool (3, 53) with multiple bending levels arranged one above the other in the direction of a bending axis (8), said bending tool having at each bending level a bending die (5, 6, 7; 55, 56, 57) and, associated with a corresponding bending die (5, 6, 7; 55, 56, 57), at least one clamping jaw (8, 9, 10) movable in the transverse direction of the bending axis (8) into at least one operating position next to the bending die and into at least one idle position away from the bending die, said clamping jaw(s) (8, 9, 10) being effectively mounted on their side facing away from the bending dies (5, 6, 7; 55, 56, 57) on a clamping jaw support (24) that can be moved in the transverse direction of the bending axis (8), said clamping jaw support (24) encompassing several clamping jaw support units (28, 29, 30) positioned one above the other in the direction of the bending axis (8) and detachably connected to one another, said clamping jaw support units (28, 29, 30) being distributed over different bending levels.

2. The bending system in accordance with Claim 1 wherein at least one clamping jaw (8, 9, 10) is provided at each of the different bending levels and clamping jaw support units (28, 29, 30) are distributed over the different bending levels associated with the clamping jaws (8, 9, 10).

3. A bending system on a bending machine for bending rod shaped and bar-shaped workpieces incorporating at least one multilevel bending tool (3, 53) with multiple bending levels arranged one above the other in the direction of a bending axis (8), said bending tool having at each bending level a bending die (5, 6, 7; 55, 56, 57) and at least one slide rail (18, 19, 20) for bracing the workpiece in the transverse direction of the workpiece and in which, on the side facing away from the workpiece in the transverse direction of the workpiece, the slide rail (18, 19, 20) is effectively mounted on a slide rail support (44, 94) which encompasses several slide rail support units (33, 33a, 34, 34a, 35, 35a, 96, 96a) positioned one above the other in the direction of the bending axis (8), said slide rail support units (33, 33a, 34, 34a, 35, 35a, 96, 96a) being associatively distributed over different bending levels and detachably connected to one another.

4. The bending system in accordance with Claim 3 wherein at least one slide rail (18, 19, 20) is provided for each of the different bending levels and wherein the respective slide rail support units (33, 33a, 34, 34a, 35, 35a, 96, 96a) associated with the slide rails (18, 19, 20) are correspondingly distributed over the different bending levels.

5. The bending system in accordance with Claim 3 wherein at each bending level, a clamping jaw (8, 9, 10) is associated with the corresponding bending die (5, 6, 7; 55, 56, 57) and is movable in the transverse direction of the bending axis (8) into at least one operating position next to the bending die and into at least one idle position away from the bending die and wherein, on the side facing away from the bending dies (5, 6, 7; 55, 56, 57) the clamping jaw (8, 9, 10) is effectively mounted in the transverse direction of the bending axis (8) on a clamping jaw support unit (24) that is movable with the clamping jaw(s) (8, 9, 10) in the transverse direction of the bending axis (8), said clamping jaw support (24) encompassing several clamping jaw support units (28, 29, 30) that are positioned one above the other in the direction of the bending axis (8) and detachably connected to one another, the respectively associated clamping jaw support units (28, 29, 30) are correspondingly distributed over the different bending levels.

6. The bending system in accordance with Claim 5 wherein, at each of the different bending levels, at least one clamping jaw (8, 9, 10) is provided and the respectively associated clamping jaw support units (28, 29, 30) are correspondingly distributed over the different bending levels.

7. The bending system in accordance with Claim 5 wherein at least one clamping jaw support unit (28, 29, 30) and at least one slide rail support unit (33, 33a, 34, 34a, 35, 35a, 96, 96a) are identical in their structural design.

8. The bending system in accordance with Claim 3 wherein at least one clamping jaw (8, 9, 10) of at least one bending level is adjustably mounted on the associated clamping jaw support unit or units (28, 29, 30) in a manner as to permit being repositioned especially in the transverse direction of the bending axis (8).

9. The bending system in accordance with Claim 3 wherein at least one slide rail (18, 19, 20) at at least one bending level is adjustably mounted on the associated slide rail support units (33, 33a, 34, 34a, 35, 35a, 96, 96a) for repositioning the workpiece.

10. The bending system in accordance with Claim 3 wherein the clamping jaw support units (28, 29, 30) and the slide rail support units (33, 33a, 34, 34a, 35, 35a, 96, 96a) are categorized by their respective designs.

11. The bending system in accordance with Claim 10 wherein the clamping jaw support units (28, 29, 30) are categorized by their linear dimension in the transverse direction of the bending axis (8), and the slide rail support units (33, 33a, 34, 34a, 35, 35a, 96, 96a) are categorized by their linear dimension in the transverse direction of the workpiece.

12. The bending system in accordance with Claim 10 wherein the clamping jaw support units (28, 29, 30) and slide rail support units (33, 33a, 34, 34a, 35, 35a, 96, 96a) are structurally categorized by their linear dimension in the direction of the bending axis (8).

13. A clamping jaw support unit for a bending system on a bending machine for bending rod-shaped and bar-shaped workpieces incorporating at least one multilevel bending tool (3, 53) with multiple bending levels arranged one above the other in the direction of a bending axis (8), said bending tool having at bending level a bending die (5, 6, 7; 55, 56, 57) and, associated with the corresponding bending die (5, 6, 7; 55, 56, 57), at least one clamping jaw (8, 9, 10) movable in the transverse direction of the bending axis (8) into at least one operating position next to the bending die and into at least one idle position away from the bending die, said clamping jaw support unit (24) mounting the clamping jaw thereon and being movable in the transverse direction of the bending axis (8), said clamping jaw support (24) encompassing several clamping jaw support units (28, 29, 30) positioned one above the other in the direction of the bending axis (8) and detachably connected to one another, and said clamping jaw support units (28, 29, 30) being distributed over different bending levels.

14. A slide rail support unit for a bending system on a bending machine for bending rod-shaped and bar-shaped workpieces incorporating at least one multilevel bending tool (3, 53) with multiple bending levels arranged one above the other in the direction of a bending axis (8), said bending tool having at each bending level a bending die (5, 6, 7; 55, 56, 57) and at least one slide rail (18, 19, 20) for bracing the workpiece in the transverse direction of the workpiece and in which, on the side facing away from the workpiece in the transverse direction of the workpiece, the slide rail(s) (18, 19, 20) is effectively mounted on a slide rail support (44, 94) which encompasses several slide rail support units (33, 33a, 34, 34a, 35, 35a, 96, 96a) positioned one above the other in the direction of the bending axis (8), said slide rail support units (33, 33a, 34, 34a, 35, 35a, 96, 96a) being associatively distributed over different bending levels and detachably connected to one another.